

GAS FIELDS OF PLENTY

NORTH WEST SHELF PROJECT (PHASES 1 & 2)

History

The North Rankin, Goodwyn and Angel gas fields were discovered in 1971 and 1972. These gas fields are located 130 kilometres north-west of Dampier in 125 metre water depth. The technical and engineering challenges facing development of these remote gas fields were significantly greater than anything faced by earlier offshore developments in Australia. Only the creation of a new Australian Liquefied Natural Gas (LNG) export industry could make the development of these large gas fields economically viable.

Phase 1 of the North West Shelf (NWS) Project was constructed between 1980 and 1984. This phase included the North Rankin A offshore drilling and production platform, a large one metre diameter submarine pipeline from the platform to the Burrup Peninsula, the King Bay Support Facility, the Karratha Gas Plant and facilities for export of residual condensate. In parallel with Phase 1, the Western Australian Government constructed the 1,530 kilometre long Dampier to Bunbury Natural Gas Pipeline. Phase 2, constructed between 1985 and 1989, included two LNG processing trains, storage tanks, export wharf facilities and six LNG tankers.

With Phase 1 and 2 investments of \$7.1 billion and a total investment of more than \$34 billion since the late 1970s, the NWS Project is one of the largest resource development projects in Australian history. At the time of construction, it was the largest engineering project underway worldwide in the oil and gas industry. Including additional phases, current capacity of the NWS Project is 46,000 tonnes per day of LNG for export, 12,600 tonnes per day of gas for Western Australia and 10,000 tonnes per day of condensate. Present day capacity is now four times larger compared to Phase 2 capacity in 1989.



Karratha Gas Plant under construction



LNG and condensate loading wharves



North Rankin platform under construction

Achievements

Significant achievements during Phases 1 and 2 include:

- development of new information for the Pilbara and offshore region on meteorology, cyclones, ocean currents, seabed foundation materials and topography;
- planning, design and construction of the largest capacity offshore gas and condensate platform in the world at that time;
- introducing a step change for LNG plant design from seawater-cooled to air-cooled facilities and from steam turbines to gas turbines;
- overcoming foundation problems associated with the carbonate sediments encountered on the North West Shelf and sharing this experience with industry;
- development of new design criteria and operational procedures for the transfer of both liquids and gas through the single submarine pipeline from North Rankin A platform;
- demonstration of a new standard for Australia in the management of safety and quality throughout all stages of the NWS Project;
- establishment of long-term domestic gas supply and LNG export contracts; and
- cementing the NWS Project's reputation as a reliable provider of domestic gas and exporter of LNG.

Project Impacts

In addition to construction on the Burrup Peninsula, local impacts included significant contributions to Government infrastructure, employee housing and other community facilities in Karratha.

At the state level, the NWS Project helped establish new industries in Western Australia including initial development of the area in Cockburn Sound that has become the Australian Marine Complex. The NWS Project also supports Western Australian universities' participation in world-class industrial research in the areas of oil and gas processing, oceanography and offshore foundation design.

The NWS Project has driven long-term economic benefits at a national level. To date, it has contributed in excess of \$26 billion in royalties and continues to inject more than \$900 million a year directly into the Australian economy.

Key People

There were many people from the project's joint venture participants and the State Government who supported the NWS Project between gas discovery in 1971 to first shipment of LNG to Japan in 1989. Some of the key individuals include:

- Geoff Donaldson, Chairman Woodside (1956 – 1984);
- Charles Allen, Woodside Chief Executive and Managing Director (1980 – 1996);
- Peter Tapper, Woodside Executive General Manager (1982 – 1990);
- Sir Charles Court, Premier Western Australia (1974 – 1982); and
- Peter Jones, Minister for Resources Development (1980 – 1983).

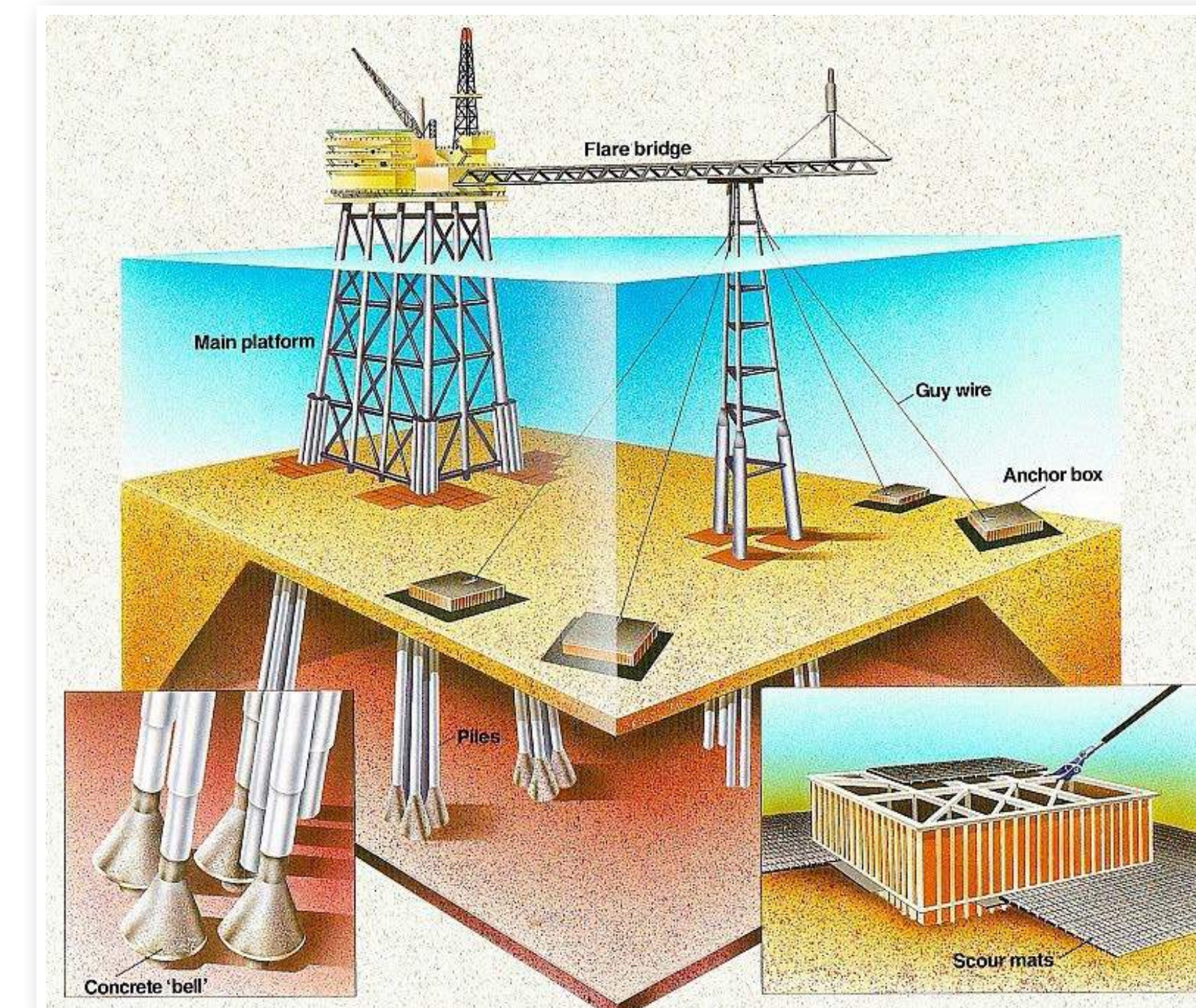
Engineers from Woodside, Shell and various contractors had to overcome the significant technical and engineering challenges faced by the project. The NWS Project would not have been possible without their ingenuity and leading international practice.

Engineering Excellence

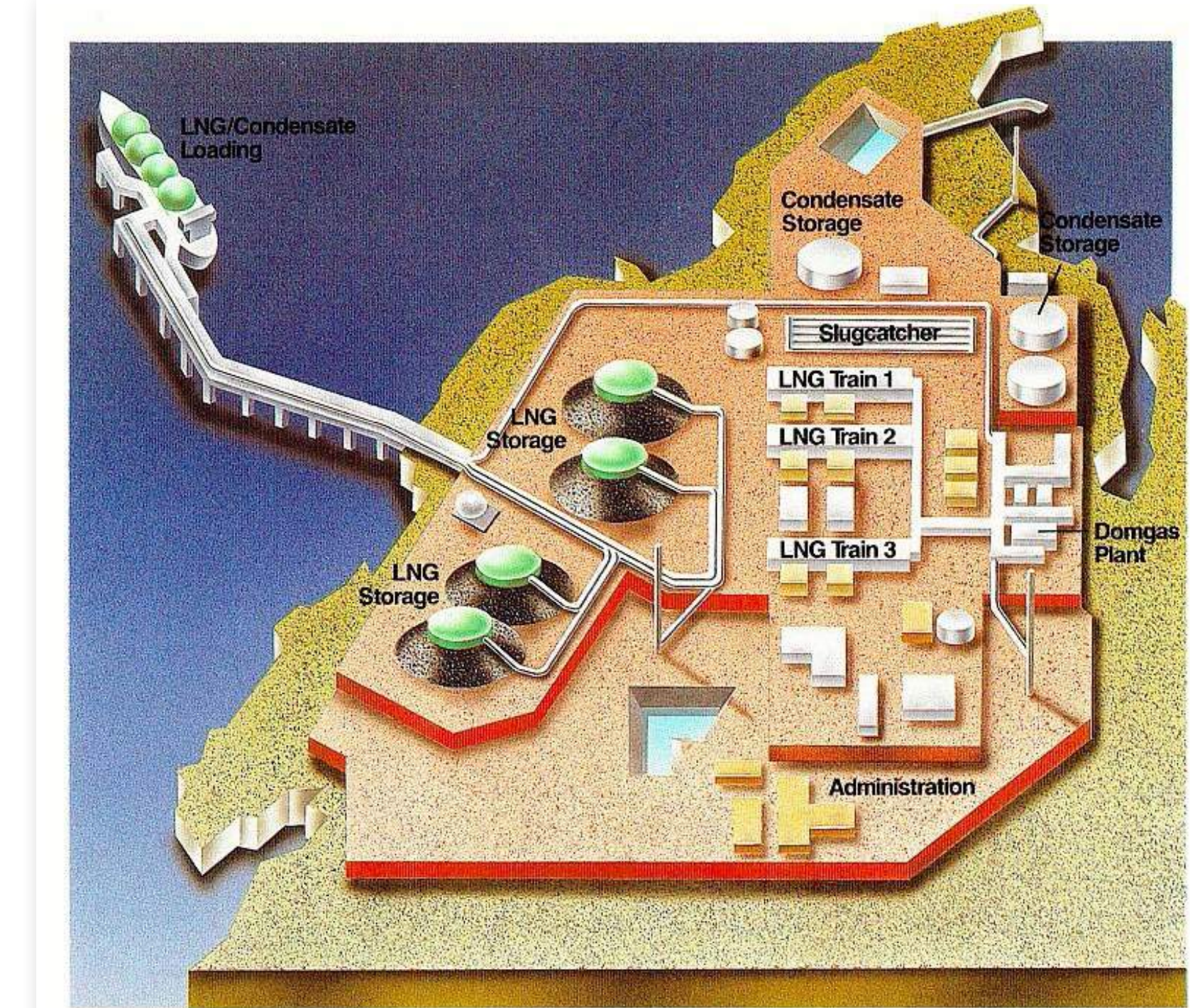
In 1990, Engineers Australia awarded the North Rankin A Platform Foundations Project the Sir William Hudson Award for the best engineering project in Australia. Other aspects of the NWS Project have also been awarded Western Australia Engineering Excellence Awards.



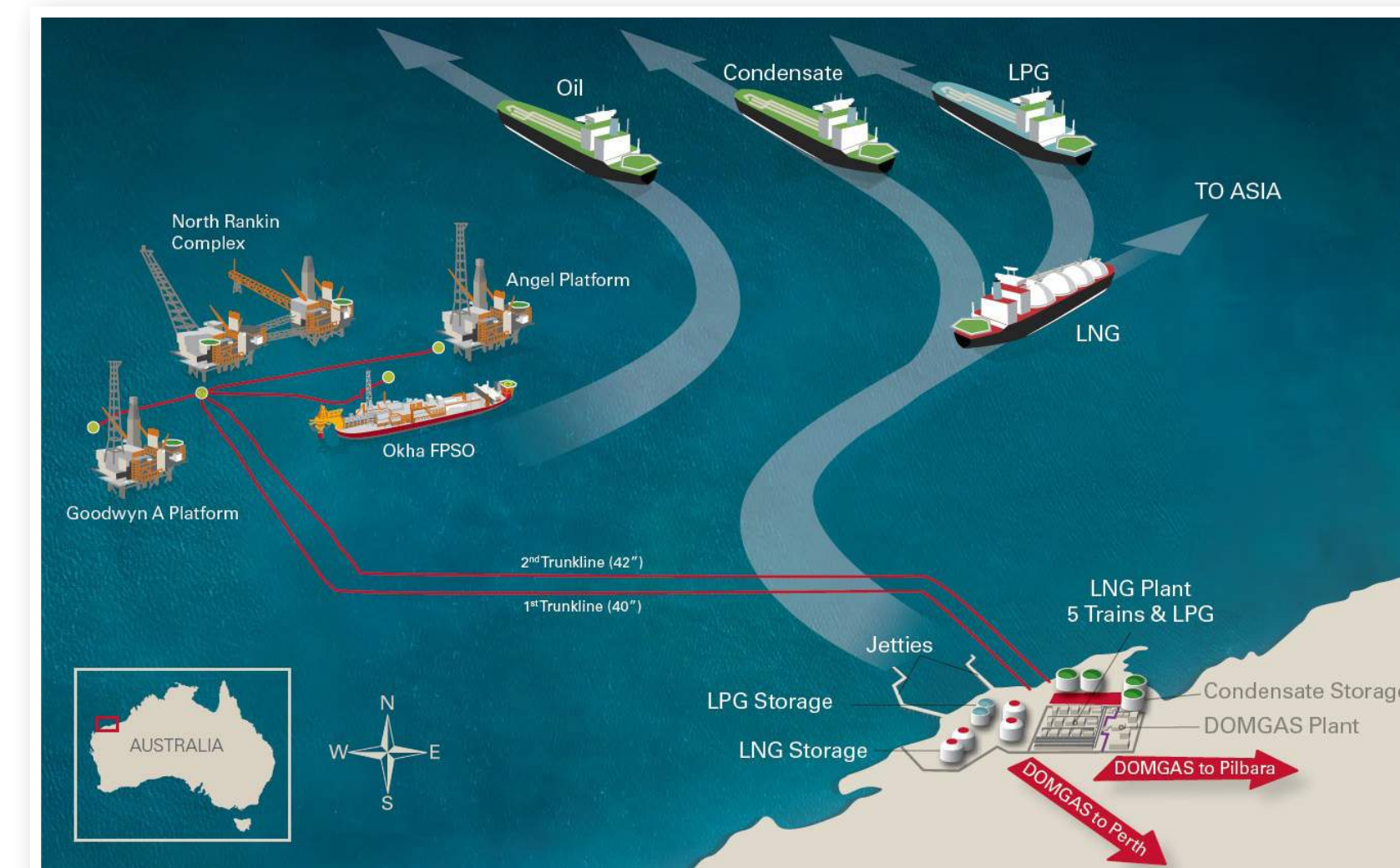
Sir Charles Court and Project participants announcing domestic gas project



North Rankin A Platform foundation remedial programme



North West Shelf Project Phase 1 and 2 layout



Overview of North West Shelf Project today

North West Shelf Project



The China National Offshore Oil Corporation is also a participant in the Project but does not have an interest in its infrastructure



An Engineering Heritage International Marker was awarded to the North West Shelf Project (Phases 1 and 2) by Engineering Heritage Australia on 2 August 2017.



For more details of this and other engineering heritage awards, go to www.engineeringheritage.com.au



For more details of the North West Shelf Project, go to www.woodside.com.au

Engineers Australia thanks Woodside Energy for their help in producing this interpretation panel and for providing photographs.